

**WE CLAIM:**

1. A cathode composition for use in the cathode of lithium-ion cells, which has a lithiated cathode material and a lithium compound additive therein, and said additive reduces or eliminates irreversible capacity loss of said cells.

2. A cathode composition for use in the cathode of lithium-ion cells which has a lithiated cathode material and a lithium compound additive therein, which additive is selected from a group comprising: lithium carbonate, lithium sulfite, lithium oxide, lithium nitride, lithium borate, lithium boride, lithium fluoride, lithium oxolate, and their mixtures.

3. A cathode composition as defined in Claim 1 or 2 in which said lithium compound additive is present in the range of 0.1% to 10% by weight.

4. A cathode composition as defined in Claim 1 in which, said cathode composition includes:

- a. Polyvinylidene Fluoride/Hexafluoropropylene
- b. Plasticizer or an electrolyte
- c.  $\text{LiCoO}_2$
- d.  $\text{Li}_2\text{Co}_3$
- e. Super-P carbon

5. A cathode composition as defined in Claim 1 or 2 in which said composition contains a lithium compound additive in the range molecularly equivalent to 2% to 40% of the lithium ions contained in the lithiated cathode material.

6. A cathode composition for lithium-ion cells as described in Claim 1, in which said lithium compound additive contains more than 10% of lithium by weight.

7. A cathode composition for metal-ion cells, which has a metal compound additive and said additive reduces or eliminates irreversible capacity loss of said cells.

8. A cathode composition for metal-ion cells, which has a metal compound additive, which is selected from a group comprising:

5  $\text{Na}_2\text{CO}_3$ ,  $\text{Na}_2\text{SO}_3$ ,  $\text{Na}_2\text{O}$ ,  $\text{Na}_3\text{BO}_3$ , and  $\text{NaF}$ , and their mixtures.

9. A lithium-ion cell which includes a composite cathode having a composition as described in claims 1, or 2, or 3, or 4, or 5, or 6.

10. A lithium-ion cell as described in Claims 1 to 6, which has balanced electrical capacities of electrodes.

10 11. A metal-ion cell which includes a composite cathode having a composition as described in claims 7, or 8.

12. A metal-ion cell as described in claims 7, or 8, which has balanced electrical capacities of electrodes.